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FLOOD INSURANCE STUDY

CITY OF GRUBBS, ARKANSAS
JACKSON COUNTY

OCTOBER 1, 1980

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 050101

FEM 1.209:

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1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the Town of Grubbs, Jackson County, Arkansas, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of the information will be to convert the Town of Grubbs to the regular program of flood insurance by the Federal Insurance Administration (FIA). Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

The initial meeting of town officials with representatives of the FIA and the U.S. Army Corps of Engineers (COE) was held on July 7, 1977, to discuss streams to be studied, criteria for floodway widths, and the limits of the study.

On February 11, 1980, an intermediate meeting was held with town officials to present results of the study. Flood heights and extent of flooding were discussed.

On April 14, 1980, the results of the studies performed by the COE were reviewed at a final coordination meeting attended by representatives of the COE, FIA, and officials of the Town of Grubbs.

1.3 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers District, Memphis, and completed by the U.S. Army Corps of Engineers District, Little Rock, for the Federal Insurance Administration under Interagency Agreement No. IAA-H-18-78, Project Order No. 9. This work, which was completed in November 1979, covered all significant flooding sources in the Town of Grubbs, Arkansas.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Grubbs, Arkansas. The area of study is shown on the Vicinity Map (Figure 1). Modified detailed studies were made for the Cache River.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through November 1984.

2.2 Community Description

The Town of Grubbs is located in the eastern part of Jackson County, Arkansas, about 12 miles north and east of the Town of Newport along State Highway 18 and near the Cache River. The 1976 estimated census of Grubbs is 453 (Reference 1). There are a few commerical structures in the town with development in Grubbs being almost entirely residential. The Cache River flows in a southwesterly direction about one-half mile southeast of the town. State Highway 18 runs east and west through Grubbs and State Highway 37 extends north of the town. The land is generally flat with a very gentle slope toward the Cache River and Toms Creek. The total relief within the corporate limits is about 2 feet.

The climate in this general area is humid with long hot summers and short mild winters. The average annnual precipitation is about 50 inches with a maximum of 81 inches and a minimum of 22 inches. The average temperature is about 61.4 degrees F with 91 years of record. The maximum and minimum temperatures observed at Newport, Arkansas, are 114 degrees F and -14 degrees F, respectively. Flooding in Grubbs results from intense local storms which may occur during any month of the year. However, most storms of this type occur generally during the spring of the year.

2.3 Principal Flood Problems

The flood problems in Grubbs occur over all of the town. The flooding occurs from overflow of the Cache River plus some runoff along Chestnut, Denton, and Toms Creeks within the town. Because of the flat slopes, velocities are low and relatively no damage results from excessive velocites.

2.4 Flood Protection Measures

The Cache River has some reaches of artificial channels which are designed to drain the rural and urban lands adjacent to the river.

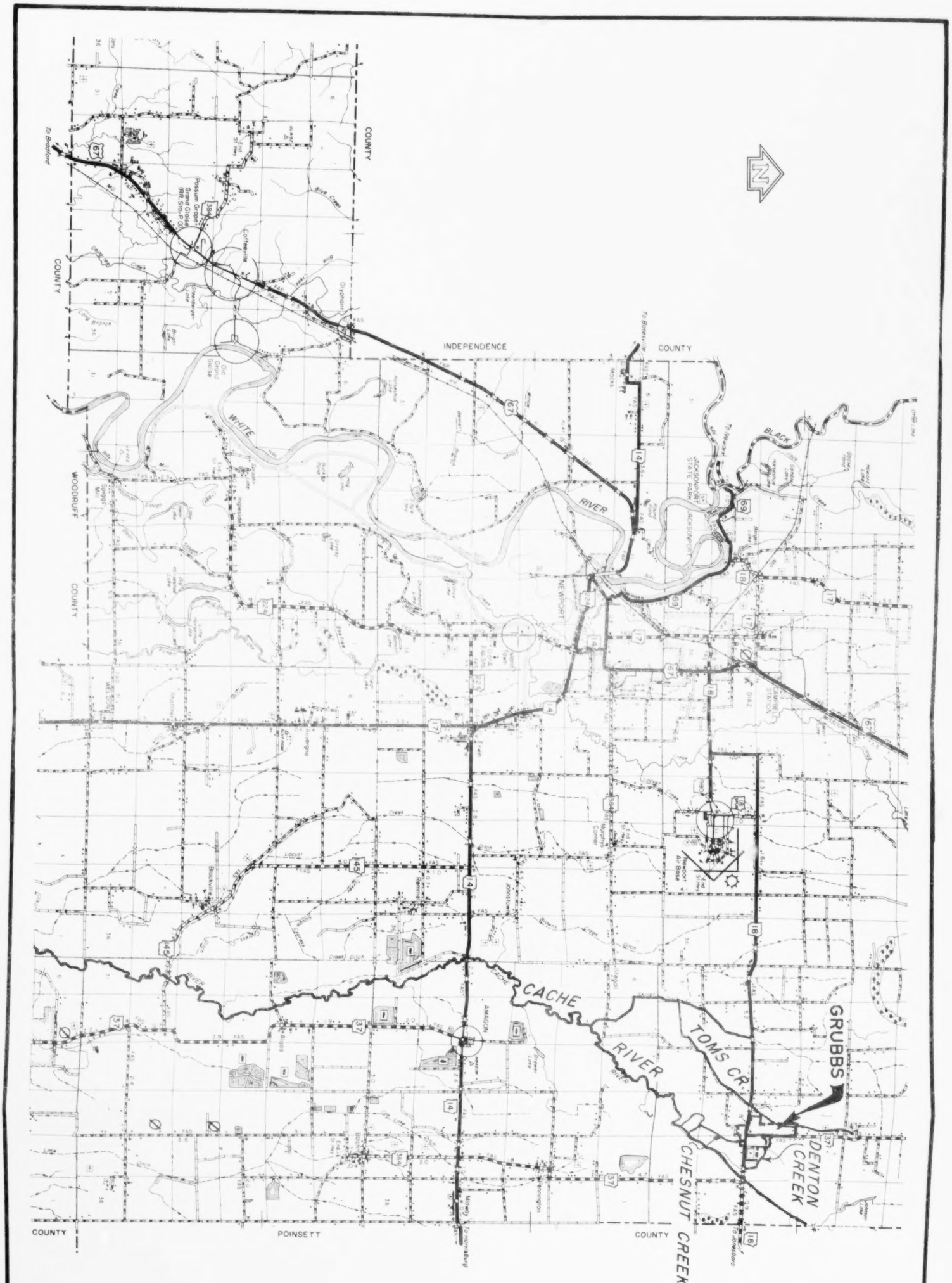

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GRUBBS, AR
(JACKSON CO.)

APPROXIMATE SCALE
0 1 2 3 4
MILES

VICINITY MAP

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10-, 50-, 100-, and 500-years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the drainage areas of the streams.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

The hydrologic studies for the Cache River were obtained from the Memphis District, COE, and were made for studies on that stream. Discharges were computed from a generalized equation, developed by the COE, that is based on observed enents. Flow lines for the 10-year floods were checked against experienced floods that have occurred in recent years. A summary of drainage area-peak discharge relationships for Cache River is given in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
CACHE RIVER					
At Grubbs, Arkansas	792	8,900	*	13,000	*

*Not determined

3.2 Hydraulic Analyses

As agreed at the initial meeting with local interests and the CCO, a modified detail study was performed. Only the 10-and 100-year profiles are shown.

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in detail.

Cross section data for the streams in the study area were obtained by field survey. All bridges and culverts were field surveyed to obtain elevation data and structural geometry. Cross sections were located at close intervals upstream and downstream of bridges and culverts in order to compute significant backwater effects of these structures.

Roughness coefficients (Manning's "n") for the Cache River were estimated from conditions along the channel and overbank sections. The roughness coefficients ranged from 0.05 to 0.07 for the main channel and 0.09 to 0.125 for for the overbank areas.

A flood profile was drawn showing computed water-surface elevations to an accuracy of 0.5 foot for the 10-and 100-year floods (Exhibit 1). Water-surface elevations of floods of the selected recurrence intervals were developed using high water marks and the generlized equations developed by the COE, Memphis District.

The starting water-surface elevations was obtained from the White River at the confluence of the Cache River. The 100-year water-surface elevation on the Cache River controls flood heights in the Town of Grubbs.

All elevations used in this study are referenced to National Geodetic Vertical Datum of 1929 (NGVD); the elevation reference mark used in this study is shown and described on the map.

Flood elevations in the Town of Grubbs may be raised by debris blockages of the streams in the study area. The hydraulic analyses for this study, however, are based only on the effect of unobstructed flow. The flood elevations as shown on the profiles are thus considered valid only is hydraulic structures in general remain unobstructed and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is used to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year flood has been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1" = 500' with a contour interval of 5 feet (Reference 2).

The boundaries of the 100- and 500-year floods are shown on the Flood Insurance Rate Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights.

No floodway was presented in this study as agreed upon at the initial coordination meeting.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source stud in detail affecting the Town of Grubbs.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet

One reach meeting the above criteria was required for the stream studied as a flooding source in the Town of Grubbs. The location of the reach is shown on the Flood Profile (Exhibit 1).

5.2 Flood Hazard Factors (FHFs)

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Town of Grubbs was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zones A3:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Grubbs is, for insurance purposes, the principal result of the Flood Insurance Study. This map (Exhibit 2) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

A flood insurance study for Amagon, Arkansas, is now underway. All flood data along the Cache River common to Grubbs and the surrounding unincorporated area will be completely coordinated in respect to discharges, profiles and areas inundated.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Cache River Reach 1	0001	-1.4	*	*	015	A3	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

*Not determined

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GRUBBS, AR

(JACKSON CO.)

FLOOD INSURANCE ZONE DATA

CACHE RIVER

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, Federal Center, Denton, Texas 76201.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of Commerce, Bureau of the Census, Population Estimates and Projections, January 1979.

2. U.S. Department of Interior, Geological Survey, 7.5-Minute Series (Topographic) Maps, Scale: 1:24,000, Contour Interval 5 feet; Grubbs, Arkansas (1965).

King, H. W. and Brater, E. F., King's Handbook of Hydraulics, 5th Edition, McGraw-Hill Book Company, 1963.

FLOOD PROFILES

CACHE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GRUBBS, AR
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